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## REMOVAL OF THE SHOWY PARTS OF FLOWERS AS AFFECTING FRUIT AND SEED PRODUCTION.

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### OBJECT OF EXPERIMENT.

In this experiment it was attempted to determine the effect of the cutting away and removing entirely of the showy parts of blossoms on the production of fruit and its consequent seed. As will be seen in the great majority of cases, these showy parts will be also enveloping parts, covering, especially in early period of blooming the stamens and pistils and thus affording more or less protection from the elements, to these essential parts of the flower. Those who are familiar with the works of Chas. Darwin, will remember that he devoted much time and study to the pollination of flowers and that he embodied the results of his studies in a book entitled: "Cross and Self-Fertilization in the Vegetable Kingdom." One of these extended experiments was the exclusion of insects from flowers by covering with a netting. All flowers so excluded from insect visits, failed to set fruit. And so it was thought that by removing the large attractive parts of flowers, that insects would perhaps pass such by and hence no fruit would be produced. The experiments recorded below were carried out during the spring and summer of 1907.

These parts were easily removed by use of either a knife blade pressing it down upon the base of petal or whatever the part might be, and forcing it by a quick stroke from its place, or by a small pair of very fine pointed scissors. In either case care was taken not to unduly injure by mutilation any of the essential parts of the flower.

## METHOD OF CONDUCTING THE EXPERIMENT.

This experiment is made up of a series of tests, which will be mentioned separately. By way of explanation when using the term test, test limb or test group, is meant that such a branch or group of blossoms has had the showy parts of the flowers removed, while by a check is meant a branch or group adjoining the test limb or group with blossoms untouched, but simply marked for comparison with the test.

## WEATHER CONDITIONS AS A FACTOR.

Inasmuch as the weather conditions have been a prominent factor in important developments in this experiment from beginning to end, mention will be made of this in the separate tests.

## PART PLAYED BY INSECTS.

As intimated, in the beginning of the experiment it was thought that insects would perhaps fail to reach those blossoms having the showy parts removed as considerable stress has been laid by various observers upon the present high development of flowers as to color and varied form, as due largely if not exclusively to insect visits. While as before mentioned the experiment has had to do with removal of showy parts, it must not be forgotten that these may also be protective. Too much stress has certainly been put upon such development of flowers as due to insect visits, and it will be shown that the visitation of insects of various orders is just as abundant after removal of the showy parts as before. In all of the tests made out of doors in the early part of spring very decided differences in amount of fruit setting was secured in check and test limbs. Thus on some test limbs there would be less than half as much fruit set as on the adjoining check limb on which the blossoms were left untouched. But we would not be justified in saying that this lack of fruit was due to lack of insect visitation when we know that insects were flying and when we see them on those flowers having the corollas removed. Thus on June 9, observations were made on a syringia bush which was visited quite early in the morning before any insects were flying and a large number of flowers were deprived of corollas. By the time this was finished insects began to come in abundance, among them being the common hive bee, many species of the smaller Apidae, Diptera, and Wasps. The visits were as frequent apparently on the flower with corollas removed as on the blossoms with all the parts. In the afternoon the bush was again visited and found that the flowers with corollas removed were still attracting insect visitors as they were in the early morning hours, the smaller apidae being quite noticeable.

Some of the more important of the separate tests will now be given somewhat more in detail.

Test I. May 1. Old apple tree in prime of bearing age, just beginning to open blossoms. Number of blossoms on test limb, 86. Number of blossoms on check limb, 88. Very cool day and no insects working. May 5, warmer and insects working. May 16, found on test limb, 31 young fruits, some of them dried and just ready to fall, while on the check limb adjoining, 55 fruits, most of them plump and growing. This makes the percentage of fruit setting 62.5% for the check limb, while on the test limb with corollas removed only 36.04%.

Test II. May 8. Wild Crab Apple Tree. Blossoms pink. Corollas removed with fine pointed scissors. Test limb of 304 blossoms. Check limb of 200 blossoms. These blossoms were not yet fully opened but were still partly enveloping the stamens and pistils. On May 29, found on the check limb 140 fruits out of the original 200, while on the test with corollas removed there were only 145 out of the original 304, making the percentages 70% for the check and 47.6% for the test.

On June 4, this was again visited and found on check 35 plump fruits and on test only 7, 17.5% for check and 2.3% for test with corollas removed.

Test III. May 9. Crab apple tree, near preceding test tree. Test limb of 71 blossoms. Check limb of 72 blossoms. Flowers not opened, but parts enveloped by corollas. Observations were made on May 21, May 29, May 30 and June 4. Frost morning of 28th of May. On June 4 on check limb there were seven fruits while on test only one, or 9.8% of fruit has set on the check limb with corollas untouched while on the test limb with corollas removed 1.4%.

Test IV. Nasturtiums in the green-house. A large number of flowers were secured for this test, there being three groups, a middle group used for a check with corollas untouched and on either side a second and third group from which the corollas were kept removed. In these green house flowers no difference was observed in test and check groups, fruit setting in as great abundance on the group with corollas removed as on those flowers with corollas left intact.

The results of more tests could be given to show the same lessening of the number of fruits setting on the groups of flowers with corollas or other showy parts removed. From this we see that a failure to set fruit on such flowers thus deprived cannot be attributed to lack of insect visitations.

#### WHY A FAILURE TO SET FRUIT?

As may be surmised from what has previously been said of the weather conditions as playing a part in the final results of the experiment, it may be said that it is this factor that has played so prominent a part, in that the flower has been deprived of a

**protection** against the elements, rather than a **signal** inviting insect visitations.

On the other hand there may be a reaction from the injury in removing the parts even though the vital parts, the stamens and pistils, remain untouched. Yet it is seen that the nasturtiums in the green house were unaffected by removing the showy parts, seeming not to suffer in the least, so with some cucumber vines in the green house, these set fruit without apparent check from cutting away these parts. This would lead us to think that injury from cutting away these parts is perhaps a minor consideration, although more tests would need to be made using for instance nasturtiums and cucumbers outside as an additional check, also several other kinds of flowers. At any rate the one thing of which there can be no mistake in interpreting is that insects are not necessarily attracted by the color of the flower parts, as has so often been said.

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